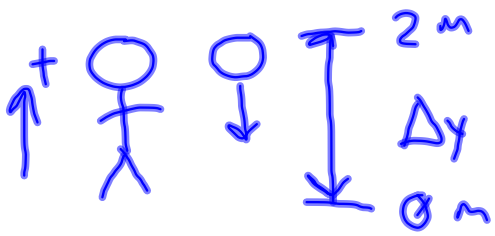
Jason drops a volleyball from 2.0 m above the floor. How long will it take before the ball hits the ground?



$V_i = 0\ m/s$

$\Delta y = -2\ m$

$a_g = -9.8\ m/s^2$

$t = ?$

$$\Delta y = \cancel{V_i t}^{0} + \frac{1}{2} a_g t^2$$

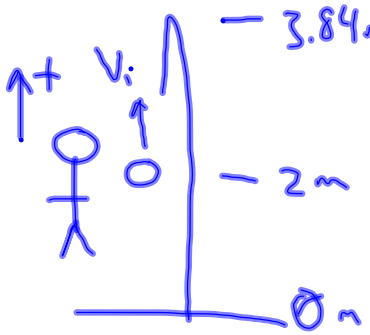
$$t = \sqrt{\frac{2\Delta y}{a_g}}$$

$$= \sqrt{\frac{2(-2\ m)}{(-9.8\ m/s^2)}}$$

$$= 0.639\ s$$

Free-Fall Practice Problems 4th Block 8.30.11

Jason then hits the volleyball so that it moves with an initial velocity of 6.0 m/s straight up.
- What is the maximum height that the ball reaches?
- How long does it take to reach the maximum height?
- How long does it take for the ball to reach the floor?



a) $v_i = 6\ m/s$ $a_g = -9.8\ m/s^2$

$v_f = 0\ m/s$

$\Delta y = ?$

$v_f^2 = v_i^2 + 2a_g\Delta y$

$\Delta y = \dfrac{-v_i^2}{2a_g}$

$= \dfrac{-(6\ m/s)}{2(-9.8\ m/s^2)}$

$= 1.84\ m$

b) $t = ?$

$v_f = v_i + a_g t$

$t = \dfrac{-v_i}{a_g}$

$= \dfrac{-6\ m/s}{-9.8\ m/s^2}$

$= .61\ s$

total time = rising time + falling time

$= .61\ s + .88\ s$

$= 1.49\ s$

falling time:

$v_i = 0\ m/s$

$\Delta y = -3.84\ m$

$a_g = -9.8\ m/s^2$

$t = ?$

$\Delta y = v_i t + \frac{1}{2} a_g t^2$

$t = \sqrt{\dfrac{2\Delta y}{a_g}}$

$= \sqrt{\dfrac{2(-3.84\ m)}{-9.8\ m/s^2}}$

$= .88\ s$

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Lab Reports